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Title: **TAP HANDLE WITH AN INTEGRAL ELECTRICAL CONNECTION**

TECHNICAL FIELD

The invention relates to an apparatus for an electrical connection that is especially effective for use with a tap handle in a beverage dispenser. With the electrical connection of the present invention, the tap handle can be internally suppled with low voltage power, with safety and reliability, by a quick connection circuit, housed within the tap handle.

BACKGROUND OF THE INVENTION

It is well known in the field of beverage dispensing systems, to supply the handle of a tap, valve, or faucet with electrical power, typically for the purpose of illuminating the handle. U.S. Patent No. 5,491,617 to Currie shows a tap that employs fiber optic cables to illuminate portions of the tap and handle. The fiber optic cable runs externally to the tap and handle. Furthermore, no connections are suggested, nor disclosed, for bridging the tap and handle, especially a solution that also addresses the need for tap handles to have a proper orientation on the tap, as directed toward patrons. More generally, for quick disconnecting electrical connections, U.S. Patent No. 3,043,925 to Wilson discloses a quick-release electrical connection that surrounds a threaded core. The connection of Wilson includes male and female clips that are cumbersome, but appear to be able to disengage when the connector is separated. U.S. Patent No. 3,159,444 to Stine shows a breakaway electrical connection very similar to Wilson '295, but it is observed that both of these quick-release references require a near-perfect alignment to function. Even when combined, these prior patent

references neither provide, nor suggest, a safe and reliable electrical connection between a handle and tap. A system is needed for a quick connection electrical circuit within the tap and tap handle, which also provides for orienting the tap handle in any desired direction about the tap. The present invention will be better understood by reference to the following detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 2 is a sectioned view of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 3 is a partially exploded view of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 4 is a partially exploded perspective view of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 5 is a side view of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 6 is a perspective view of an upper contact core of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 7 is a plan view of a lower contact core of a tap handle with an integral electrical connection, according to an embodiment of the invention;

FIG. 8 is a section view of a lower contact core of a tap handle with an integral electrical

connection, taken along section line 8-8 of FIG. 7, according to an embodiment of the invention;

FIG. 9 is a plan view of an upper contact core of a tap handle with an integral electrical connection, according to an embodiment of the invention; and

FIG. 10 is a section view of an upper contact core of a tap handle with an integral electrical connection, taken along section line 10-10 of FIG. 9, according to an embodiment of the invention.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

A foremost purpose of the present invention provides a tap handle with an integral electrical connection. The tap handle is attachable to a standard tap valve or faucet, typically used in dispensing beverages, such as beer. A preferred embodiment of an integral electrical connection within a tap handle assembly, or an "electrified tap" **21**, is shown in FIGs. 1 through 10. The electrified tap provides an efficient and standardized solution to the problem of managing power cords and wires to a tap handle **22**, to provide a power source to the tap handle, typically for the purpose of internally illuminating the tap handle.

As shown in FIGs. 3 and 5, the electrified tap **21** includes a bushing **23**, which is receivable onto a locknut **24**. As preferred, the locknut is a conventional component of a tap handle assembly, built to be received onto a tap stem **26**. As is typical, the action of the tap stem controls the flow of a beverage thorough a tap **27**.

In an alternative embodiment of the present invention, the bushing **23** and the locknut **24** may be combined into a unitized bushing and nut **28**, as shown in FIG. 4. Also alternatively, and as most preferred, the locknut is manufactured specifically for use with the present invention and substituted for the standard locknut included with the tap **27**, which in the alternative, may be any dispensing

valve or faucet having a means of control similar to the tap handle **22**, which can be conventionally referred to simply as a "handle."

As shown in FIG. 3, for a preferred embodiment of the present invention, a retaining ring **29** is preferably employed between the bushing and the lock nut, primarily to provide a "snap" assembly to hold the bushing and the locknut **24** together, allowing the bushing to remain stationary as the locknut rotates about the tap stem. The tap stem is typically a 3/8 inch diameter with a standard, male thread, typically 16 UNC (16 threads per inch, American Standard, Coarse Unified Thread Series, as defined under ANSI BI.I-1989), or a substantial equivalent. The locknut, or the unitized bushing and nut are most preferably female threaded 3/8, and 16 UNC, also. If desired, any non-standard or alternative threading, tap diameter, or nut diameter could be utilized with the present invention.

As shown in FIG. 1 and 3, a lower contact core **30** is receivable within the bushing **23**, or as shown in FIG. 4, the unitized bushing and nut **28**, as an alternative. Hereinafter, whenever the locknut **24**, or the bushing are referred to, it should be understood that the discussion also applied to the unitized bushing and nut. The lower contact core is detailed in FIGs. 1 and 7. The lower contact core includes a lower inner contact **32**, and a lower outer contact **33**. The lower inner contact is contained within the lower contact core in a concentric relation to the lower outer contact **32**.

An electrical current is supplied to the lower contact core **30**, as shown in FIGs. 1, 2, and 7. The electrical current supplied to the electrified tap **21** is embodied in a tap electrical conductor **35**. The tap electrical conductor is most preferably, a two pole electrical connector with a first supply pole **37**, and a second supply pole **38**. The first supply pole connects to the lower inner contact **32** of the lower contact core **30**, and the second supply pole connects to the lower outer contact **33**.

In a preferred embodiment of the electrified tap **21**, the tap electrical conductor **35** provides approximately, approximately 800 milliamperes (mA) of 12 volt (V) electrical power. Note that the term "approximately" is used herein to refer to a range of values, understood by a person skilled in the pertinent field or skill, as substantially equivalent to the herein stated values in achieving the desired results, in a range typical to the selection, accuracy, or precision of conventional tooling, measurement, or manufacturing. Alternative voltages or amperages could easily be utilized in the present invention. 12V is selected as a typical direct current power supply, easily transformed from standard 110V alternating current and at low amperage, and not considered a hazard in the event of inadvertent shock. The preferred amperage "draw" or "load" of the electrified tap is dictated by the power supply needs of the electrified tap. For most purposes, less than one ampere of low voltage power is sufficient to adequately illuminate the tap handle **22**, attached to the electrified tap.

For the tap electrical power conductor **35**, the first supply pole **37** and a second supply pole **38** is a wire pair **39**, as shown in FIG. 1. The wire pair may be any conventional, two conductor wire, of sufficient gauge to provide for the transmission of the low amperage needed for the electrical tap **21**, at a sufficiently low resistance. As an alternative to the wire pair, a pair of flat wire ribbons, or some similar pairing of electrical conductors, known to those skilled in the field of low voltage wiring, could be employed. A "keyway" as is known by those skilled in milling technologies, could be employed instead of the routing the tap electrical power conductor through the bushing. Additionally, such a keyway could be employed to hide the power conductor within the locknut. A multiples of such a keyway could be milled into the locknut to provide several optional placements of the tap electrical power conductor.

As shown in FIG 2, the bushing **23** rotates freely in relation to the locknut **24**. The locknut

performs the function of tightening the individual components of the electrified tap **21** together. The bushing can therefore maintain a particular orientation, allowing the tap electrical power conductor **35**, or wire, likewise to maintain the desired direction. This feature provides for the hiding of the power conductor, behind the electrified tap, if desired. Preferably, as also shown in FIG. 2, the bushing clasps the locknut by the conventional "snap" assembly, utilizing the retaining ring **29**, to allow the bushing and locknut to rotate in relation to each other about the tap stem **26**. The assembly of the bushing, retaining ring and the locknut, together serve as a conventional locknut, as found in non-powered, or otherwise conventional taps handles.

A ferule **43** is threadingly receivable onto the tap stem **26**. The ferrule is received onto the tap stem, and abuts to the bushing **23**, as shown in FIG. 2. Similar to the locknut **24**, the ferrule includes a central ferrule opening **44** having a female thread within. Most preferably, this ferrule opening is approximately 3/8 of an inch in diameter, and tapped with a 16 UNC thread to receive the tap stem. Again, as with the locknut, any non-standard or alternative threading, tap diameter, or ferrule opening diameter could be utilized with the ferrule of the present invention, if desired.

For a preferred embodiment of the present invention, the ferrule **43** includes an upper contact core **50** that is receivable within the ferule. Similar to the lower contact core **30** of the bushing **23**. As shown in FIG. 6, the upper contact core includes an upper inner contact **52** and an upper outer contact **53**. The upper inner contact is contained within the upper contact core in a concentric relation to the upper outer contact **52**. The upper and lower contact cores can include ridges around their perimeters, to snap into place within the ferrule or bushing, respectively. Also alternatively, the contact core may be glued, screwed or somehow mounted in place, as would be achieved by a person skilled in such assembly practices.

As shown in FIGs. 2, 8 and 10, the lower contact core **30** has a lower contact face **54**, and the upper contact core **50** has an upper contact face **56**. When the upper contact face of the upper contact core meets against the lower contact face of the lower contact core, as shown in FIG. 2, the upper contact core is energized by the electrical current. Specifically, when the upper contact core touches the lower contact core, an inner electrical contact **57** forms between the lower inner contact **32** and the upper inner contact **52**, and an outer electrical contact **58** forms between the lower outer contact **33** and the upper inner contact **53**.

When viewed from the side, or in profile, as shown in FIG. 8, for the lower contact core **30**, the lower inner contact **32** and the lower outer contact **33**, are both approximately "flush" or even across the lower contact face **54**. Similarly, as shown in FIG. 9, for the upper contact core **50**, the upper inner contact **52** and the upper outer contact **53**, are both approximately flush across the upper contact face **56**.

For a most preferred embodiment of the electrified tap **21** of the present invention, the inner electrical contact **57**, and the outer electrical contact **58** are achieved without regard to the orientation of the upper contact core **50** relative to the lower contact core **30**, about the tap stem **26**. And so, the tap handle **22** functions, energized, or is electrified, regardless of the orientation of the ferule **43** to the bushing **23** about the tap stem. Conventional tap handles are installed by first lowering the locknut **24** onto the tap stem completely, then manually twisting or screwing the tap handle onto the tap stem until it meets against the locknut. Once the tap handle and locknut meet, the tap handle is reverse twisted away from the lock nut, until the tap handle faces the desired direction. The locknut is then screwed in the reverse direction of rotation, up the tap stem and toward the handle, tightening the locknut against the tap handle. This action serves to maintain the tap handle locked in the correct

and desired position. The electrified tap of the present invention is installed with a similar operation. Employing the concentric electrical contacts, the electrified tap can orient in any desired direction about the tap stem and maintain the electrical contacts between the lower and upper contact cores.

The electrical current received into the tap handle **22** is embodied in a handle electrical conductor **65**. Similar to the tap electrical power connector **35**, the handle electrical conductor is most preferably, a two pole electrical connector with a first receiving pole **67**, and a second receiving pole **68**. The first receiving pole connects to the upper inner contact **52** of the upper contact core **50**, and the second receiving pole connects to the upper outer contact **53**.

A foremost purpose of the of the present invention is to supply the tap handle **22** of the electrified tap **21** with electrical power. This electrical power, in the form of an electrical current, is preferably utilized for the purpose of illuminating the tap handle, as shown in FIG. 5. This illumination can be achieved through any known form or combination of light emitting electrical devices, including incandescent bulbs, flourescent bulbs, and light-emitting diodes, collectively referred to herein as a powered element **70**. Alternatively, the powered element can be any motor, speaker or display that could be utilized within the tap handle. Preferably, the first receiving pole **67**, and the second receiving pole **68** connect to the powered element, and so energize the powered element, which is broadly defined herein as whatever electrical device the tap handle houses or serves.

The upper inner contact **32**, the lower outer contact **33**, the upper inner contact **52**, and the upper outer contact **53**, can each be referred to herein, simply as a contact **75**. Each of the contacts are preferably electrically conductive, metallic materials, such as aluminum copper, zinc or a suitable alloy, as known in the field of electrical connections. Most preferably, copper is employed to form

the contacts.

As shown in FIG. 3 and 6, each contact **75** is preferably formed substantially in the shape of a ring, and each contact includes a contact attachment **76**. In the lower contact core **30**, the contact attachment receives the first supply pole **37** in the case of the lower inner contact **32**, and the second supply pole **38** in the case of the lower outer contact **33**. In the upper contact core **50**, the contact attachment receives the first receiving pole **67** in the case of the upper inner contact **52**, and the second receiving pole **68** in the case of the upper outer contact **53**. As is most preferably, the contact attachments are separated below the lower contact face **54** for the lower contact core, and separated above the upper contact face **56** for the upper contact core, to prevent an inadvertent short between contacts.

Preferably, the contact attachment **76** may be a standard crimp connection, as shown in FIGs. 3 and 4, for the lower inner contact **33**, and the upper inner contact **52**, or a clip connection as shown, for use with the lower outer contact **34** and the upper outer contact **53**. Also, as an alternative to the preferred contact attachments, a soldered connection, a screw terminal, or any other electrical junction as is known in the field of electrical wiring technology may be employed with the contacts **75**.

In a preferred alternative to the ring-shaped contacts **75** of the present invention, the contacts can be formed with an alternative shape to better provide for the inner electrical contact **57**, as formed between the lower inner contact **32** and the upper inner contact **52**, and the outer electrical contact **58**, as formed between the lower outer contact **33** and the upper outer contact **53**. Specifically, as shown in FIGs. 1, 6, and 7, a "wave pattern" **80** can be imparted to the contacts, to better provide for the inner electrical contact and outer electrical contact. The wave pattern insures

that the upper inner and lower contacts, as well as the upper outer and lower contacts, will meet with each other solidly, without movement or shifting in position, to provide the needed electrical contacts, and so prevent arcing, sparking or jumping between the respective lower and upper contacts. The wave pattern may be broadly defined as a departure from a purely circular path by the contacts. Either the lower contact core **30** or the upper contact core **50**, or as preferred, both the lower contact core and the upper contact core can include the multiple of ribs or a similar feature, serving the purpose of deflecting or deforming the circular path of the contacts.

FIG. 2 shows the lower contact core **30** and the upper contact core **50** meeting, as is accomplished when the ferule **43** is tightened down onto the bushing **23** about the tap stem **26**. When viewed in profile, the contacts are approximately flush across the lower contact face **54** of the lower contact core, and the upper contact face **56** of the upper contact core, as also preferably occurs when the herein described wave pattern **80** is utilized.

In a most preferred embodiment of the electrified tap **21**, as detailed in FIGs. 8 and 10, the contacts **75** are slightly offset from the lower contact face **54** and the upper contact face **56**, in the lateral direction, along the tap stem **26**. Specifically, the lower inner contact **32** and the lower outer contact **33** are slightly recessed within the lower contact core **30** relative to the lower contact face. To make the inner electrical contact **57** and the outer electrical contact **58**, the upper inner contact **52** and the upper outer contact **53** are slightly raised above the upper contact core **50**, relative to the upper contact face. Therefore, the upper contacts extend slightly into the lower contact core, when the upper contact core meets the lower contact core. This lateral offset in the contacts provides for a better connection between the contacts, and also reduces the chance of inadvertent shock when the tap handle **22** is removed from the tap stem, while the lower contacts are electrified. Additionally,

with the lower inner contact and the lower outer contact slightly recessed within the lower contact core relative to the lower contact face, any conventional, typically non-powered tap handle, without the upper contact core, is compatible for use with the present invention.

As shown in FIG. 3, a cushion ring **83** is preferably placed between the upper contact core **50** and the ferule **43**. The cushion ring serves to maintain pressure between upper contact core and the lower contact core **30**, and so maintain the inner electrical contact **57** and outer electrical contact **58**. Additionally, the cushion ring allows the tap handle **22** with the features of the present invention, to be used in any conventional non-powered tap in a non-powered mode of operation, without further modification.

To maintain the contacts **75** in the wave pattern **80**, and also to better retain the contacts within either the lower contact core **30**, or the upper contact core **50**, a multiple of ribs **85** are preferably employed, as shown in FIGs. 6 and 7. The multiple of ribs are preferably formed of the same insulative material as the upper and lower contact cores are formed. Most preferably, the contact core are injection molded or milled, as an alternative, with the multiple of ribs included within. The material of the contact cores is preferably a plastic, as selectable by a technician skilled in plastic material selection and fabrication, and most preferably a thermoformable plastic, selected for resistance to melting, and having a high strength.

As an alternative embodiment of the present invention, besides the preferred "two pole" connection, as described herein above, could be employed. Less or more pairs of generally ring shaped contacts **75** could be used. For example, with a single pole electrical connection, the tap stem **26** could be employed as a ground. Safety and shock hazard concerns would likely render this an undesirable alternative. Any multiple of contact "sets," defined herein as upper contact and lower

contact pairs, as typified by the upper inner contact **52** and the lower inner contact **32**, are considered within the scope of the present invention.

Again, especially with the aid of the wave pattern **80** in the contacts **75** within the electrified tap **21** of the present invention, the inner electrical contact **57** and the outer electrical contact **58** are achieved without regard to the orientation of the upper contact core **50** to the lower contact core **30**, as each are received onto and positioned on the tap stem **26**, to abut each other with the upper contact face **56** abutted to the lower contact face **54**. And so, the electrified tap handle functions safely and reliably, with the quick connecting circuit as described above, regardless of the orientation of the ferule **43** to the bushing **23** about the tap stem.

In compliance with the statutes, the invention has been described in language more or less specific as to structural features and process steps. While this invention is susceptible to embodiment in different forms, the specification illustrates preferred embodiments of the invention with the understanding that the present disclosure is to be considered an exemplification of the principles of the invention, and the disclosure is not intended to limit the invention to the particular embodiments described. Those with ordinary skill in the art will appreciate that other embodiments and variations of the invention are possible, which employ the same inventive concepts as described above. Therefore, the invention is not to be limited except by the following claims, as appropriately interpreted in accordance with the doctrine of equivalents.